

REMARKS

Claims 1-5 are pending. Applicants respectfully submit no new material is presented herein.

Claims 1-5 Recite Patentable Subject Matter

Claims 1-3 and 5 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Number 6,506,605 to Allen et al. (Allen). Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Allen. Applicants respectfully traverse both rejections.

Applicants respectfully point out that Claim 1 recites a detector for a vehicle equipped with a heat exchanger, in which a catalyst coating provided in the heat exchanger decomposes a chemical substance in air passing through the heat exchanger, the detector including, among other features, a sensor that detects a remaining amount of the catalyst coating; and a control unit that generates an alarm based upon detection of the sensor, *wherein a position of detection of the sensor is determined according to a temperature characteristic of the heat exchanger.*

Claim 2, which depends from Claim 1 and includes all of the features recited therein, recites the additional feature of *the position of detection of the sensor is determined according to a flow rate of the air passing through the heat exchanger in addition to the temperature characteristic of the heat exchanger.*

Applicants respectfully submit Allen does not disclose or suggest all of the features recited by Claim 1 for the following reasons.

The Office Action alleges that based on the disclosure in column 10, lines 28-41 and column 13, lines 7-20 of Allen, claim 1 is anticipated by Allen. However, Applicants

respectfully submit Allen does not disclose or suggest the feature of a position of detection of the sensor is determined according to a temperature characteristic of the heat exchanger (Claim 1). Further, Applicants respectfully submit Allen also does not disclose or suggest the feature of the position of detection of the sensor is determined according to a flow rate of the air passing through the heat exchanger, in addition to the temperature characteristic of the heat exchanger (Claim 2).

Applicants respectfully submit that the cited passage of Allen, that is, column 10, specifically enumerates several factors on which the **efficiency** of the ozone depleting substance to decompose ozone to oxygen in the motor vehicle application depends. However, Applicants respectfully note the cited passage as well as the remainder of Allen fails to disclose or suggest the factors, such as iii) the operating temperature that controls catalytic activity of the ozone depleting catalyst, and/or iv) the amount of atmospheric air that passes over the catalyst coated on the radiator surface, is or can be indicative of (or related to) *loss or deterioration* of the ozone depleting catalyst.

While the cited passage in column 13 of Allen mentions strategic locations of the sensor, Applicants submit Allen does not disclose or suggest **how** the mentioned strategic locations are determined. Column 14 of Allen discusses the positions of the sensor, but only in a theoretical aspect. In particular, Applicants note Allen states: "In theory, the entire heat exchange surface of the radiator can be monitored, but this is not necessary. It is sufficient if the radiator is monitored at the strategic positions noted above or at a single position if indicative of an "average" or representative position or area" (Col. 14, lines 51-53). Applicants respectfully submit that from the above-quoted

descriptions provided in Allen, it is still unclear *how* the position of detection of the sensor is determined.

Referring to column 10, line 42 et seqq., Applicants note Allen states: the “principal factor which has been found to affect the conversion *efficiency* of the catalyst coating is *external matter, referred to as airborne particulate matter, to which the radiator is exposed*” (emphasis added); . . . “It is possible for such external matter to be deposited on the active sites of the catalyst and block the catalyst sites, physically or chemically” (emphasis added); “*Stones and foreign objects* impact the radiator during vehicle operation resulting in localized damage to any fin row and obviously the catalyst coating on the fin row in that localized area” (emphasis added); “it is also potentially possible for *mud* to be lodged into the radiator and conceivably, a vehicle could splash through a number of puddles such that the entire radiator becomes clogged with *mud* (although this has not been observed in practice)” (emphasis added); and “with thousands of miles of age per vehicle, the catalyst surface can contain deposits of ambient airborne particulates less than 10 μm in size ($<\text{PM}_{10}$) and contaminant phases foreign road matter, principally in the form of *salts* (carbonates, nitrates, sulfates, chlorides) which contain elements such as C, N, O, Na, Mg, Al, Si, S, K and Ca. The presence of these *chemical contaminants* ... is believed to be the principal reason which adversely affects the *efficiency* of the catalyst coating” (emphasis added).

Furthermore, Applicants note that in column 11, line 64 to column 12, line 7, Allen states: “contaminant deposits, per se, cannot cause the ozone depletion system to become nonfunctional, the ozone depletion system can only cease to remove ozone from atmospheric air only when the catalyst coating is no longer present on the

radiator”; “It is to be appreciated that the catalyst coating is exposed, over time, to large volumetric flows of atmospheric air containing any number of particulates which strike the thin catalyst coating and can physically erode, ablate or spall the catalyst coating”; and “wearing away of the catalyst coating can occur in several ways” (col. 12, lines 12-13). See also column 12, lines 8-34, and Figures 5B-5C.

As such, Allen expressly teaches that the decrease in performance (loss and deterioration) of the catalyst is caused by air flow striking the catalyst coating (“homogeneous”) or by chipping, gouging, flaking or breaking away (“heterogeneous”), or by combination of “homogeneous” and “heterogeneous” wear.

Claim 1 clearly recites the position of detection of the sensor is determined according to the temperature characteristic of the heat exchanger because the Applicants have discovered that the loss of a catalyst coating provided on a heat exchanger **by heat** has a great influence on decrease in performance of the ozone decomposing device. Thus, according to the invention by Claim 1, the **temperature characteristic of the heat exchanger** is used to predict the decrease of the ozone decomposing performance due to the loss of the catalyst coating. Consequently, the position of detection of the sensor is determined according to the temperature characteristic of the heat exchanger (Claim 1), and *additionally* according to a flow rate of the air passing through the heat exchanger (Claim 2).

Applicants respectfully submit that without considering the temperature characteristic of the heat exchanger, the loss of catalyst that occurs over time cannot accurately be detected. Allen does not consider the temperature characteristic of the heat exchanger in determining a detection position of the sensor.

To qualify as prior art under 35 U.S.C. §102, a single reference must teach, identically disclose, each feature of a rejected claim. Also, to establish *prima facie* obviousness, each and every feature of the rejected claim must be taught or suggested by the applied art of record. See M.P.E.P. §2143.03. As explained above, Allen does not disclose, teach, or suggest looking to the temperature characteristic of the heat exchanger in determining a detection position of the sensor or even how to look for such a characteristic in determining the detection position of the sensor. As such, Applicants respectfully submit that Claim 1 is not anticipated by or rendered obvious in view of Allen, and should be deemed allowable.

Claims 2-5 depend from Claim 1. It is respectfully submitted that these four (4) dependent claims be deemed allowable for the reasons Claim 1 is allowable, as well as for the additional subject matter recited therein.

Withdrawal of the rejections is respectfully requested.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of Claims 1-5, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 106145-00070.**

Respectfully submitted,
ARENT FOX PLLC

A handwritten signature in black ink, appearing to read 'MO' followed by a stylized flourish.

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